Appendix B

Detailed Cost Estimates by Assessment Type

Table B.1 presents a cost estimate summary for the assessment types include in the TRWQMP. Tables B.2 through B.8 outline the assumptions and detailed costs estimates used for each assessment type, including the annual management and reporting component of the TRWQMP.

Table B.1. Cost Summary by Assessment Type

	Year 1	GIS Sub-watershed Source Area Assessment (per assessment)	Rapid Assessment (33 stream miles)	Bioassessment (per station)	Discrete Sample Collection - Community Level (per station)	Discrete Sample Collection - Tributary Level (per station)	Near-continuous Automated Turbidity (per station)	Near-continuous Automated Samplers (per station)	Data management and annual reporting
Permitting and Easement	Access agreements, easements, special use permits, and streambed alteration permits		$3,000	$3,000	$3,000	$6,000	$6,000	$6,000	
Equipment	Instrument and equipment purchase		$3,000	$1,667	$650	$1,800	$9,500	$21,000	
Analytical	Analytical cost		N/A	$500	$3,000	$9,090	$8,080	$24,240	
Labor	Station establishment and/or installation		$10,000	$1,250	$1,125	$2,250	$7,500	$11,250	
	Operations and maintenance of station		N/A	N/A	$1,250	$1,250	$6,250	$12,000	
	Data collection		$25,000	$2,250	$1,250	$1,500	$6,000	$15,000	
	Data management		$7,500	$1,000	$1,875	$3,750	$6,000	$12,000	
	Data analysis and summary	$8,000	$7,500	$1,000	$1,500	$2,500	$9,000	$12,000	
	Annual Cost* (Year 1 of implementation)	$8,000	$56,000	$11,000	$14,000	$29,000	$59,000	$114,000	$74,000
	Annual Cost* (Years 2-15) *see assessment worksheet for details and assumptions for ongoing station costs*	$1,000	$42,000	$7,000	$10,000	$19,000	$38,000	$80,000	$55,000

* Cost rounded up to nearest thousand.

Table B.2. Rapid Assessment for 33 Stream Miles Assumes Main Stem of Truckee River plus some key tributary evaluations.			
Category	**Item**	**Estimated cost ($/yr)**	**Details and Assumptions**
		Year 1 Estimates	
Permitting and Easement	Access agreements and easements	$3,000	Stream access will be gained through public land whenever possible. Year 1 only.
Equipment	Instrument and equipment purchase	$3,000	Sieves, survey tape measures, clipboards, beakers, PVC survey squares, maps, etc.
Analytical	Analytical cost	N/A	
Labor	Station establishment and/or installation	$10,000	Site map/aerial development (80 hrs).
	Operations and maintenance of station	N/A	
	Data collection	$25,000	Assumes 2 people can complete 3 stream miles per 10 hr day .
	Data management	$7,500	Database development (20 hrs), Data input (40 hrs).
	Data analysis and summary	$7,500	GIS shapefile and map generation (60 hrs).
	Total Annual Cost (Year 1)	$56,000	
	Total Annual Costs (Years 2-10)	$41,500	20% reduction in labor costs following first year of reach designation, data management and map generation techniques. Assumes 1/2 equiment cost each subsequent year. Annual costs can be signficantly reduced by incorporating NGO's and volunteer efforts.
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		
	$125		
	EQUIPMENT LIST		
	Item	**Cost**	
	High resolution aerial photographs	$2,000	
	Survey tapes	$500	
	Sample grids	$250	
	Camera and miscellaneous equipment	$250	
	Total Equipment Cost	$3,000	

Table B.3 Bioassessment			
Category	**Item**	**Estimated cost per station ($/yr)**	**Details and Assumptions**
		Year 1 Estimates	
Permitting and Easement	Access agreements and easements	$3,000	Stream access will be gained through public land whenever possible. Year 1 only.
Equipment	Equipment purchase	$1,667	Includes items outlined in EQUIPMENT LIST. Assumes equipment shared between 3 stations.
Analytical	Analytical cost	$500	Assumes 1 sample per station (composite of 8 samples) and Analysical Cost Per Sample detailed below.
Labor	Station establishment and/or installation	$1,250	Half day for 2 field personnel per station. Year 1 only.
	Operations and maintenance of station	N/A	
	Data collection	$2,250	4 hrs per station using 4 field personnel, plus 2 hrs preparation.
	Data management	$1,000	Assumes 8 hrs per assessment.
	Data analysis and summary	$1,000	Assumes 8 hrs per assessment.
	Total Annual Cost Per Station (Year 1)	$10,667	Typical tributary bioassessment will include 3 stations.
	Total Annual Cost Per Station (Years 2-10)	$6,417	No cost for station establishment and/or installation.
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		Assumes average of 3 stations per bioassessment.
	$125		
	EQUIPMENT LIST		
	Item	**Cost**	
	Benthic nets/trays equipment	$2,000	
	Sediment sampling equipment	$1,000	
	Miscelleous solutions, bottles, etc	$2,000	
	Total Equipment Cost	$5,000	
	Equipment cost per station	$1,667	
	ANALYTICAL COSTS	**Cost**	
	Lab enumeration per sample	$500	
	Analytical Cost Per Sample	$500	

Table B.4. Discrete Sample Collection - Community Level			
Category	**Item**	**Estimated cost per station ($/yr)**	**Details and Assumptions**
		Year 1 Estimates	
Permitting and Easement	Access agreements and easements	$3,000	Stream access will be gained through public land whenever possible. Year 1 only. Assumes no streambed alteration permit needed for this assessment type.
Equipment	Instrument and equipment purchase	$650	Includes items outlined in EQUIPMENT LIST.
Analytical	Analytical cost	$3,000	Assumes 1 sample for 10 events per year. Assumes higher analytical cost ($300/sample) more likely to include some combination of hydrocarbons, organics and/or trace metals
Labor	Station establishment and/or installation	$1,125	1/2 day for 2 field personnel per station. Year 1 only.
	Operations and maintenance of station	$1,250	Assumes 5 events plus annual maintenance of station as necessary.
	Data collection	$1,250	Assumes 10 hrs per year per station.
	Data management	$1,875	Assumes 15 hrs per year per station.
	Data analysis and summary	$1,500	Assumes 12 hrs per year per station.
	Total Annual Cost Per Station (Year 1)	$13,650	
	Total Annual Cost Per Station (Years 2-10)	$9,200	Assumes annual budget requires 1/2 of instrument/equipment needs to ensure proper operation each year. No cost for station establishment and/or installation.
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		
	$125		
	EQUIPMENT LIST		
	Item	**Cost**	
	Staff plate	$150	
Continuous stage	In-situ Level Troll	N/A	
	Passive sampler materials (1 per station)	$100	
Passive Samplers	Passive sampler construction	$150	
	Misc. equipment	$250	
	Total Equipment Cost	$650	
	ANALYTICAL COSTS		
	Analayte	**Cost**	
Required	TSS	$40	
	Nitrogen species	$92	
	Phosphorus species	$70	
Optional	Hydrocarbons	$380	
	Pesticides	$250	
	Trace metal suite	$150	
	Min. Analytical Cost Per Sample	$202	TSS, NOx, NH4+, TKN, SRP, DP and TP only.
	Max. Analytical Cost Per Sample	$982	Above plus oil & grease, TEPH, TPH-diesel, trace metal suite (15 trace metals) and 3 organic pesticide compounds selected based on specific land use above station.

Table B.5. Discrete Sample Collection - Tributary Level			
Category	**Item**	**Estimated cost per station ($/yr)**	**Details and Assumptions**
		Year 1 Estimates	
Permitting and Easement	Access agreements and easements	$6,000	Stream access will be gained through public land whenever possible. Year 1 only. Assumes a streambed alteration permit needed for this assessment type.
Equipment	Instrument and equipment purchase	$1,800	Includes items outlined in EQUIPMENT LIST.
Analytical	Analytical cost	$9,090	Assumes 3 samples for 15 events per year. Assumes **minimum** analytical cost.
Labor	Station establishment and/or installation	$2,250	One day for 2 field personnel per station. Year 1 only.
	Operations and maintenance of station	$1,250	Assumes field-ready laptop with Level Troll software for data download, periodic surveys, repairs and annual maintenance of site as necessary.
	Data collection	$1,500	Assumes 12 hrs per year per station.
	Data management	$3,750	Assumes 30 hrs per year per station.
	Data analysis and summary	$2,500	Assumes 20 hrs per year per station.
	Total Annual Cost Per Station (Year 1)	$28,140	
	Total Annual Cost Per Station (Year 2-10)	$18,690	Assumes annual budget requires 1/3 of instrument/equipment needs on average to ensure proper operation each year. No cost for station establishment and/or installation.
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		
	$125		
	EQUIPMENT LIST		
	Item	**Cost**	
	Staff plate	$150	
Continuous stage	In-situ Level Troll	$750	
	Passive sampler materials (3 per station)	$300	
Passive Samplers	Passive sampler construction	$500	
	Misc. equipment	$100	
	Total Equipment Cost	$1,800	
	ANALYTICAL COSTS		
	Analayte	**Cost**	
Required	TSS	$40	
	Nitrogen species	$92	
	Phosphorus species	$70	
Optional	Hydrocarbons	$380	
	Pesticides	$250	
	Min. Analytical Cost Per Sample	$202	TSS, NOx, NH4+, TKN, SRP, DP and TP only
	Max. Analytical Cost Per Sample	$832	Above plus oil & grease, TEPH, TPH-diesel, and 3 organic pesticide compounds selected based on specific land use above station.

Table B.6. Near-continuous Automated Turbidity Stations			
Category	**Item**	**Estimated cost per station ($/yr)**	**Details and Assumptions**
		Year 1 Estimates	
Permitting and Easement	Access agreements and easements	$6,000	Stream access will be gained through public land whenever possible. Year 1 only. Assumes a streambed alteration permit needed for this assessment type.
Equipment	Instrument and equipment purchase	$9,500	Includes items outlined in EQUIPMENT LIST.
Analytical	Analytical cost	$8,080	Assumes 40 discrete SSC samples during elevated flow conditions and 40 nutrient samples per year. Assumes **minimum** analytical cost.
Labor	Station establishment and/or installation	$7,500	Assumes 60 hrs to identify station needs, fabricate housing, construct and test station
	Operations and maintenance of station	$6,250	Assumes 50 hrs to survey cross section, measure velocity for rating curve and maintain equipment and station
	Data collection	$6,000	Assumes 10-15 sampling events per year, 4 hrs per event.
	Data management	$6,000	Integrating all data into event, seasonal and annual load estimates. Assumes 4 hrs per month.
	Data analysis and summary	$9,000	Graphical and tabular summaries of time series hydrology and turbidity, event, seasonal and annual load summaries of pollutants sampled (nutrients and sediment) (72 hrs).
	Total Annual Cost Per Station (Year 1)	$58,330	
	Total Annual Cost Per Station (Years 2-10)	$37,330	No cost for station establishment and/or installation.
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		
	$125		
	EQUIPMENT LIST		
	Item	**Cost**	
	FTS DTS12 digital turbidity sensor	$3,500	Cost for field laptop, manual flow measurement device (pymy meter) or necessary hand held calibration probes included in consultant cost. Proper operation of automated equipment requires the ownership and operation of these additional tools to properly maintain and complete the ncessary field tasks.
	Data logger and pressure transducer (depth/temp)	$2,000	
	Installation materials/housing	$2,000	
	5-6 passive sample on bridge footings	$1,500	
	bottles, calibration, solutions, misc	$500	
	Per station Equipment	$9,500	
	Annual equipment costs (yrs 2-10)	$2,000	Assumes annual maintenance and/or replacement of one of the main components, modules or sensors.
	ANALYTICAL COSTS		
	Analayte	**Cost**	
Required	TSS	$40	
	Nitrogen species	$92	
	Phosphorus species	$70	
Optional	Hydrocarbons	$380	
	Pesticides	$250	
	Min. Analytical Cost Per Sample	$202	TSS, NOx, NH4+, TKN, SRP, DP and TP only
	Max. Analytical Cost Per Sample	$832	Above plus oil & grease, TEPH, TPH-diesel, and 3 organic pesticide compounds selected based on specific land use above station.

Table B.7. Near-continuous Automated Sampling Stations			
Category	**Item**	**Estimated cost per station ($/yr)**	**Details and Assumptions**
		Year 1 Estimates	
Permitting and Easement	Access agreements and easements	$6,000	Stream access will be gained through public land whenever possible. Year 1 only. Assumes a streambed alteration permit needed for this assessment type.
Equipment	Instrument and equipment purchase	$21,000	Includes items outlined in EQUIPMENT LIST.
Analytical	Analytical cost	$24,240	Assumes 100 samples per station-year. Assumes **minimum** analytical cost + 20% for periodic inclusion of other parameters.
Labor	Station establishment and/or installation	$11,250	Assumes 90 hrs to identify station needs, fabricate housing, construct and test station; software programming.
	Operations and maintenance of station	$12,000	Assume average of 8 hrs per month to maintain equipment and station.
	Data collection	$15,000	Assumes 10-15 sampling events per year. 10 hrs per event.
	Data management	$12,000	Integrating all data into event, seasonal and annual load estimates. Assume 8 hrs per month.
	Data analysis and summary	$12,000	Graphical and tabular summaries of time series hydrology and turbidity, event, seasonal and annual load summaries of pollutants sampled (nutrients and sediment) (96 hrs).
	Total Annual Cost Per Station (Year 1)	$113,490	
	Total Annual Cost Per Station (Years 2-10)	$79,240	Annual equipment costs (yrs 2-10) used (see below). No cost for station establishment and/or installation
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		
	$125		
	EQUIPMENT LIST		
	Item	**Cost**	
	Isco 6712 Auto Sampler with data logger	$9,000	Cost for field laptop, manual flow measurement device (pymy meter) or necessary hand held calibration probes included in consultant cost. Proper operation of automated equipment requires the ownership and operation of these additional tools to properly maintain and complete the ncessary field tasks.
	Temperature, conductivity probes	$1,000	
	FTS DTS12 digital turbidity sensor	$3,500	
	Area velocity sensor	$3,000	
	Installation equipment/housing/flume	$3,500	
	bottles, calibration, solutions, misc	$1,000	
	Per Station Equipment	$21,000	
	Annual equipment costs (yrs 2-10)	$4,000	Assumes a 10 yr life of sampler, but annual maintenance and/or replacement of one of the main components, modules or sensors.
	ANALYTICAL COSTS		
	Analayte	**Cost**	
Required	TSS	$40	
	Nitrogen species	$92	
	Phosphorus species	$70	
Optional	Hydrocarbons	$380	
	Pesticides	$250	
	Min. Analytical Cost Per Sample	$202	TSS, NOx, NH4+, TKN, SRP, DP and TP only
	Max. Analytical Cost Per Sample	$832	Above plus oil & grease, TEPH, TPH-diesel, and 3 organic pesticide compounds selected based on specific land use above station.

Table B.8. Management and Reporting			
Category	**Item**	**Estimated Cost**	**Details and Assumptions**
Consultant Costs		$5,000	
QAPP	Quality Assurance Protection Plan	$5,000	Required for some grant funding agencies. Year 1 only.
Data management	Construct database structure	$3,750	Year 1 only
	Obtain and integrate data from independent assessments	$7,500	Annual cost; assumes that County and Town will take responsibility for enforcing compliance in data collection from independing monitoring efforts
	QA/QC and maintain integrated database	$7,500	Annual cost; assumes that County and Town will take responsibility for enforcing that data is reported in format requried by TRWQMP
Synthesis	Graphical and quantitative integration of TRWQMP data	$10,000	Year 1 costs 25% higher to create templates for data presentation format
	Review, analysis and integration of SWMP compliance monitoring results	$5,000	Annual cost to review and integrate SWMP compliance monitoring results with performance monitoring
	Synthesis and analysis of observations	$10,000	Year 1 costs 25% higher to create templates for analysis, report format and key areas of discussion
	Presentations and meetings	$3,750	Year 1 costs 50% higher to communicate and share results
	Draft Report Preparation	$11,250	
	Final Report Preparation	$5,000	Annual cost
	Total Annual Cost (Year 1)	$73,750	
	Total Annual Cost (Years 2-10)	$54,125	
Detailed cost breakdowns			
	Average Hourly Rate for Consultant		
	$125		